Name: _____   Date: _____

Polynomial Factoring solution (version 675)

1. **The quadratic formula says if** $ax^2 + bx + c = 0$ **then** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. **Use the quadratic formula to solve the following equation.**

$$x^2 - 10x + 52 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(52)}}{2(1)}$$

$$x = \frac{-(-10) \pm \sqrt{100 - 208}}{2(1)}$$

$$x = \frac{10 \pm \sqrt{-108}}{2}$$

$$x = \frac{10 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{10 \pm 6\sqrt{3}\,i}{2}$$

$$x = 5 \pm 3\sqrt{3}\,i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of** $2 + 3i$ **and** $7 + 4i$ **in standard form** $(a + bi)$.

Solution

$$(2 + 3i) \cdot (7 + 4i)$$
$$14 + 8i + 21i + 12i^2$$
$$14 + 8i + 21i - 12$$
$$14 - 12 + 8i + 21i$$
$$2 + 29i$$

Polynomial Factoring solution (version 675)

3. **Write function $f(x) = x^3 - 3x^2 - 22x + 24$ in factored form. I'll give you a hint: one factor is $(x - 1)$.**

Solution

$$
\begin{array}{c|cccc}
 & 1 & -3 & -22 & 24 \\
1 & & 1 & -2 & -24 \\
\hline
 & 1 & -2 & -24 & 0 \\
\end{array}
$$

$$f(x) \;=\; (x-1)(x^2 - 2x - 24)$$

$$f(x) \;=\; (x-1)(x+4)(x-6)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) \;=\; -(x+6) \cdot (x+1)^2 \cdot (x-3)^2$$

Sketch a graph of polynomial $y = p(x)$.